

NASA TECH BRIEF

Ames Research Center



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

Protective Encapsulation of Implantable Biotelemetry Units

The problem:

Electronic components are usually protected from the environment by thin coatings of paint, polymers, waxes, etc., but special coatings must be used to protect body-implantable biotelemetry units which consist of electronic telemetry circuits, batteries, and electromagnetic radiators. The problem of providing adequate protection for body-implantable telemetry units is complicated by the highly penetrating and corrosive nature of animal body fluids and by the need for electromagnetic radiators to be electrically unshielded.

How it's done:

An encapsulation method which uses one or more layers of poly(*p*-xylylene) in conjunction with a material such as silicone rubber so as to take advantage of the properties of both materials.

The solution:

The component parts of the device are interconnected electrically and then protected with conventional prior-art devices such as metal or ceramic packages with metal-to-glass connection feed-through seals. The assembled device, attached to the electromagnetic radiator, is then coated with an encapsulating layer of silicone rubber to provide mechanical support and protection and also to form a body-compatible surface contour. A layer of poly(*p*-xylylene) is then deposited on the silicone rubber and then another layer of silicone rubber is subsequently applied over the poly(*p*-xylylene). As many alternating coats of

silicone rubber and poly(*p*-xylylene) can be applied as is considered desirable. The method of encapsulation utilizes the favorable properties of silicone rubber in animal fluids with the chemical inertness of poly(*p*-xylylene) and its resistance to penetration. Because the layer of poly(*p*-xylylene) is sandwiched between silicone rubber, it is protected from mechanical damage, but the outer surface of the capsule retains the desirable characteristics of silicone rubber when immersed in body fluids.

Notes:

1. Various types of poly(*p*-xylylene) can be used so as to emphasize preferred characteristics. The polymer can be applied over the components prior to application of the first layer of silicone rubber. An adhesive promoter may be applied under, over, or on both sides of a layer of poly(*p*-xylylene).
2. Other materials can be substituted for the silicone rubber.
3. No additional documentation is available. Specific questions, however, may be directed to:
Technology Utilization Officer
Ames Research Center
Moffett Field, California 94035
Reference: B72-10301

Patent status:

No patent action is contemplated by NASA.

Source: Nigel C. Tombs and Jack M. Pope
Ames Research Center
(ARC-10514)

Category 04, 05

